



CABLE, LOW TENSION, POLYETHYLENE INSULATED, THIN WALL THICKNESS, FLEX FUEL RESISTANT

WSS-M1L123-A4

1. SCOPE

The material defined by this specification is a low tension stranded cable insulated with cross-linked polyethylene. The cable is similar to SAE J 1128, Type TXL.

2. APPLICATION

This specification was originally released for automotive applications requiring the use of insulated low tension cable to be exposed to automotive flex fuels. Note: The assemblers of electrical wire harnesses shall use the bulk wire suppliers as shown in the Ford Motor Company Materials Approved Source List.

3. REQUIREMENTS

3.0 STANDARD REQUIREMENTS FOR PRODUCTION MATERIALS

Material suppliers and part producers must conform to the Company's Standard Requirements For Production Materials (WSS-M99P1111-A).

3.4 CONDUCTOR

3.4.1 Unless otherwise specified, the individual strands of the conductor shall be soft or annealed copper conforming to ASTM B 3, except strand dimensions. These dimensions shall be controlled to yield the cross-sectional area listed for the conductor of the finished cable per Table 1. Conductor area shall be determined by measuring individual strand diameters and calculating the sum of the individual strand areas. As an alternate method, conductor area may also be determined in accordance with ASTM B 263. For this procedure, let $k=2$ in accordance with ASTM B 174, para. 12.3.

3.4.2 The strands shall be bunched per ASTM B 174. The maximum lay length shall be as specified in ASTM B 174 Table 2, Column A. Conductor strand count shall comply with Table 1. Missing strands are not allowed.

3.5 INSULATION

3.5.1 The color of the insulation shall be specified on the engineering drawing of the component utilizing this material. Base and stripe colors shall correspond to SAE J 1128. Where striping is specified, one or two stripes may be used. The width of the stripe(s) shall be a minimum of 0.3 mm but not more than 15% of the circumference of the wire. If the insulation is dyed or painted, all cable quality tests in Section 3.6 must be performed on the finished product. The insulation and the color may show no evidence of peeling or cracking and must conform to the color tolerances specified with the exception of quality tests 3.6.2 and 3.6.3.

Date	Action	Revisions
2004 02 18	Revised	Revised Table 2 S. White
2003 06 24	Revised	Para 3.0 inserted; Para 3.1, 3.2, 3.3, 3.7, 4 deleted
1999 06 16	Activated	





3.5.2 The insulating material shall be flame retardant, homogeneous, cross-linked polyethylene, similar to SAE J 1128, Type TXL. The material shall adhere closely to, but strip readily from the conductors, leaving them free of insulation and in suitable condition for applying terminals.

3.5.3 Insulation Mechanical Properties

These tests shall be conducted in accordance with SAE J 1128, for Type TXL, except that the insulation shall be conditioned for 24 +/- 2h at 60 +/- 2 °C prior to taking original measurements and that the aging test temperature shall be 160 +/- 2 °C.

3.5.4 Insulation thickness shall comply with the requirements of Table 2. Insulation thickness shall be measured with an optical device accurate to at least 0.01 mm or a pin micrometer with a diameter of 0.5 mm. The test method for determining minimum insulation thickness at any point shall be in accordance with ANSI/UL-1581, Reference Standard for Electrical Wires, Cables and Flexible Cords, Paras 240 through 250.11. In case of dispute, the referee method shall be the optical device.

3.6 CABLE QUALITY TESTS

The following tests: Dielectric Test, Cold Bend Test, Flame Test, Fluid Compatibility Test, Ozone Resistance, Pinch Test, Abrasion Resistance, Cross linking, and Strip Force shall be conducted per SAE J 1128 for type TXL cable.

The tests listed below shall be conducted in addition to the tests listed above.

3.6.1 Cable Diameter

Measure the outside diameter of a 2000 mm specimen with an optical measurement device accurate to +/- 0.01 mm (other devices may be used but the referee method will be the optical device) by taking a minimum of 2 readings approximately 90° apart. Move the sample approximately 400 mm and repeat the procedure for a total of five cross-sections. The mean of all the readings will determine the outside diameter of the cable. The outside diameter will conform to the values listed in Table 2.

3.6.2 High Temperature Resistance

25 mm of insulation shall be removed from each end of a 600 mm sample of finished cable. The sample shall be suspended around a cylindrical mandrel having a diameter specified in Table 3. The weight specified for the Cold Bend Test above shall be suspended from each end of the conductor. This condition shall be maintained for 168 h in a mechanical convection oven at a temperature of 165 +/- 2 °C.

When cooled to room temperature, the specimen shall be removed from the mandrel and wrapped in the reverse direction around a mandrel of diameter specified in the Cold Bend Test using the Cold Bend Test method (except reverse bend conducted at room temperature). No cracks or splits in the insulation are permitted. After the reverse mandrel wrap the specimen shall be subjected to the Dielectric Test.